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BEFORE THE BOARD OF PATENT APPEALS

AND INTERFERENCES

Application Number: 10/767,190

Filing Date: January 30, 2004

Appellant(s): SETTER ET AL.

Tara Laster
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 12/3/2007 appealing from the Office action mailed 7/19/2007.

(1) **Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

(2) **Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) **Status of Claims**

The statement of the status of claims contained in the brief is correct.

(4) **Status of Amendments After Final**

No amendment after final has been filed.

(5) **Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

(6) **Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) **Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) **Evidence Relied Upon**

6,311,786	GIARDINO et al.	11-2001

(9) **Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

2. Claims 1-3, 7-13 and 17-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Giardino et al. (US 6,311,786).

With regard to claim 1, Giardino et al. discloses a method comprising the step of: applying a toque pulse to a fastener (col. 3, lines 10-13), detecting a signal representing the time-amplitude waveform of the toque pulse (col. 3, lines 60-63), fitting an equation that approximates the time amplitude waveform (col. 4, lines 7-15), processing the equation to determine the torque being applied to the fastener (col. 4, lines 16-49), comparing the torque to a pre-set torque objective (col. 5, lines 29-38) and applying a second torque pulse to the fastener if torque is less than pre-set torque objective.

While Giardino et al. do not expressly state that the method includes fitting an equation that approximates the time-amplitude waveform by selecting one mathematical expression from a set of mathematical expressions and selecting at least one parameter that describes the torque pulse from a set of parameters. Giardino et al.'s method for determining the torque applied to a fastener is capable of having more preprogrammed set of mathematical torque expressions in addition to torque equation and selecting at least one parameter that describes the torque pulse from a set of parameters which describes the torque pulse from a set of parameters.

Further, Giardino et al.'s method includes impulse equation, which is used to calculate torque and Giardino et al.'s method use equation representing angular momentum to also calculate torque as shown in column 4.

With regard to claim 2, Giardino et al. shows an equation that includes positive amplitude; wherein as I is defined as product of force and time (see col. 4, lines 7-14), when an impact is detected, tf is set to be impact plus some number of clock counts which is equivalent as in claimed.

With regard to claim 3, Giardino et al. shows a linear equation T=d(Ir)/dt, which detects impulse which measures torque at different point in time over a period of time and provide the desired torque.

With regard to claim 7, Giardino et al. show the step of selecting the torque pulse from two parameters (impact number and time duration) that describes torque pulses from a set of parameters (col. 4, lines 29-62).

With regard to claim 8, Giardino et al. shows a signal producing magneto-elastic torque transducer (37 magneto-elastic ring) coupled to the shaft (18) and induction coil (32 coupling) proximate shaft (front end of the shaft).

With regard to claim 9, Giardino et al. shows an impact tool (10).

With regard to claim 10, Giardino et al. shows a wrench (10).

With regard to claim 11, Giardino et al. discloses a method comprising the steps of: applying a plurality of toque pulse to a fastener (col. 3, lines 10-13), detecting a signal representing the time-amplitude waveform of the toque pulse (col. 3, lines 60-63), converting the signals into mathematical expression (col. 4, lines 10-28), fitting an equation that approximates

the time amplitude waveform (col. 4, lines 7-15), processing the equation to determine the torque being applied to the fastener (col. 4, lines 16-49), and the data gathered and/or calculated is displayed and /or written to data storage, as desired as in step 20 and turning off the green light (col. 6, lines 17-18 and 20), which is equivalent of terminating the fastener tightening sequence as claimed.

While Giardino et al. do not expressly state that the method includes fitting an equation that approximates the time-amplitude waveform by selecting one mathematical expression from a set of mathematical expressions and selecting at least one parameter that describes the torque pulse from a set of parameters. Giardino et al.'s method is capable of having more preprogrammed set of mathematical torque expressions so as to select mathematical torque expressions for each torque pulse. Further, Giardino et al.'s method includes impulse equation, which is used to calculate torque and Giardino et al.'s method use equation representing angular momentum to also calculate torque as shown in column 4.

With regard to 12, Giardino et al. shows an equation that includes positive amplitude; wherein as I is defined as product of force and time (see col. 4, lines 7-14), when an impact is detected, tf is set to be impact plus some number of clock counts which is equivalent as in claimed.

With regard to claim 13, Giardino et al. shows a linear equation T=d(Ir)/dt, which detects impulse which measures torque at different point in time over a period of time and provide the desired torque.

With regard to claim 17, Giardino et al. shows the steps of converting the signal into an equation representing the torque pulses from two parameters (impact number and time duration) that described torque pulses from a set of parameters (col. 4, lines 29-62).

With regard to claim 18, Giardino et al. shows a signal producing magneto-elastic torque transducer (37 magneto-elastic ring) and induction coil (32 coupling) proximate shaft (front end of the shaft).

With regard to claim 19, Giardino et al. shows a torque impact tool (10).

With regard to claim 20, Giardino et al. shows a wrench (10).

With regard to claim 21, Giardino et al. discloses an apparatus comprising an impact tool (10), a shaft (18) operatively connected to the impact tool, a torque transducer (37) coupled to the tool, a sensor (30) proximate the impact tool, a controller (50) enabling the impact tool to apply one or more pulses to the shaft (18), and which is capable of receiving waveform signals from sensor (30), monitors and conditions the signals, selects an equation that represents the signals, processes the equation to obtain torque on the fastener and disables the impact tool.

With regard to claim 22, Giardino et al. shows a pneumatic torque wrench (10).

With regard to claim 23, Giardino et al. shows linear equation; $I=\int Fdt$; $T=d(Ir)/dt$.

Claim Rejections - 35 USC § 103

4. Claims 4-6, 14-16 and 24-26 rejected under 35 U.S.C. 103(a) as being unpatentable over Giardino et al.

With regard to claims 4, 5, 14, 15, 24 and 25, Giardino et al. disclose all claimed subject matter but lack the specific teaching of an equation showing a correlation coefficient; however, it

would have been obvious to one of ordinary skill in the art at the time of the invention to provide the data processing unit (50) of Giardino et al. with the capability of determining correlation coefficient through an equation since the apparatus of Giardino et al. anticipates the claimed structure and method for determining torque applied to a fastener.

With regard to claim 6, 16 and 26, Giardino et al. disclose all claimed subject matter but lack the specific teaching of a non-linear equation for torque pulses, however, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the data processing unit (50) of Giardino et al. with the capability of representing the torque pulses with non-linear equation since the apparatus of Giardino et al. anticipates the claimed structure and method for determining torque applied to a fastener.

(10) Response to Argument

A. Examiner interpretation of the independent claim

During patent examination of the claims, the pending claims must be given their broadest reasonable interpretation consistent with the specification. Phillips v. AWH Corp., 415 F.3d 1303, 75 USPQ2d 1321 (Fed. Cir. 2005). See also MPEP § 2111. Moreover, while the claims of issued patents are interpreted in light of the specification, prosecution history, prior art and other claims, this is not the mode of claim interpretation to be applied during examination. During examination, the claims must be interpreted as broadly as their terms reasonably allow. In re Am. Acad. of Sci. Tech Ctr., 367 F.3d 1359, 1369, 70 USPQ2d 1827, 1834 (Fed. Cir. 2004). See also MPEP § 2111.01.

Independent claim 1 recites:

A method for determining the torque applied to a fastener comprising the steps of: applying a torque pulse to a fastener; detecting a signal representing the time-amplitude waveform of the torque pulse; fitting an equation that approximates the time-amplitude waveform by selecting one mathematical expression from a set of mathematical expressions and selecting at least one parameter that describes the torque pulse from a set of parameters; processing the equation to determine the torque being applied to the fastener; comparing the torque to a pre-set torque objective; and applying a second torque pulse to the fastener if the torque is less than the pre-set torque objective.

B. The rejection of claims 1-3, 7-13 and 17-23 under 35 U.S.C. § 102(b) is proper and should be affirmed.

Appellant is arguing on page 7, that Giardino et al. fail to disclose, teach or suggest determining torque including the step of fitting an equation that approximates the time-amplitude waveform of the torque pulse by selecting one mathematical expression from a set of mathematical expressions, as recited in claim invention. For the reasons set forth in the rejection, Gardino et al. anticipates elements of the claim and should be affirmed. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). See also MPEP § 2131.

Giardino et al. as disclosed in the rejection above, anticipates the elements set forth in the claim. Moreover, Appellant has not shown "a set of mathematical expressions", as recited in

independent claim 1. Further, Giardino et al. have shown that calculating torque pulse is not limited to a special mathematical expression, and that torque pulse is also calculated from any an equation that satisfies a mathematical expression as defined by the tool user. Giardino et al. have shown an equation chosen from a set of mathematical expression that satisfies a torque pulse, which meets the claimed method.

Appellant further argues that the invention require multiple expressions and the ability to select one expression from the multiple expressions. Since there are infinite mathematical expressions from which torque pulse is calculated, Giardino et al. have chosen a set of equation from the infinite mathematical expressions from which torque pulse is calculated, and have calculated torque pulse from **I = Fdt (col**. 4, line 11) and **T=d(Ir)/dt** (col. 4, line 40). The processor of Giardino et al. has the ability to account for any variations in fastener tightness since the Giardino et al.'s method as disclosed in column 1, line 66 accounts for fluctuations of force over time.

Appellant is further arguing that, Giardino et al. teaches neither multiple mathematical torque expressions nor the ability to select one expression from the multiple mathematical expression. Thus, if the threaded joint that the tool of Giardino et al is tightening is unique in some way, that renders the torque equation of Giardino et al. inappropriate, and its output inaccurate, such that the joint will not be properly tightened.

Giardino et al.'s processor is capable of selecting multiple mathematical torque expressions and the ability to select one expression from the multiple mathematical expression to calculate torque pulse. The limitation does not require a unique threaded joint in order for torque to be calculated. The same principle of calculating torque pulse applies to threaded joint of any kind.

Appellant is arguing on page 10, that Giardino et al. do not recite selecting one mathematical torque expression from a set of mathematical torque expressions. Because neither the impulse nor angular momentum equations together (and individually) determine torque in Giardino et al., one would necessarily have to select two equations from the alleged set of mathematical expressions, in order to determine torque.

Giardino et al.'s torque pulse equation is considered one mathematical expression, but for simplistic sake, Giardino et al. have further shown the derivation of torque pulse expression by the steps shown.

Appellant is further arguing that no evidence has been provided that Giardino et al. is capable of having more preprogrammed sets of mathematical torque expressions.
"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). See also MPEP § 2131.

Giardino et al. disclose a processor of an electronic control (50) for processing data input and capable of making decision with respect to the information provided. Moreover, Giardino et al. have shown in the flowchart, Figures 2A and 2C steps of "selecting".

Further, Giardino et al. have shown in column 4, lines 63-67 processor performs a function according to operational input command.

Appellant is arguing that claims 2 and 12 recite the equation/mathematical expression include a parameter selected from a list of parameters and that Giardino et al. disclosure does not relate to the parameters recited in the claims. Giardino et al. disclosure as shown in the rejection

satisfied the claimed limitation of claims 2 and 12. Appellant has provided no equation/mathematical expression in claims 2 and 12. The 102 rejection should be affirmed.

C. The rejection of claims 4-6, 14-16 and 24-26 under 35 U.S.C. § 103(a) is proper and should be affirmed.

Appellant is arguing that, Giardino et al. fails to disclose, teach or suggest the step of fitting an equation that approximates the time-amplitude waveform of the torque pulse by selecting one mathematical expression from a set of mathematical expressions.

Appellee is aware that there are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art. *In re Rouffet,* 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998). *See also* MPEP § 2143.01.

Appellant acknowledged that Giardino et al. teaches that only one equation is needed, T=d(Ir)/dt, assuming from the data supplied. The teaching of Giardino et al. shows that it would have been obvious to one skilled in the art that the processor of Giardino et al. has the ability to approximate time-amplitude waveform of a torque pulse from a selection of multiple mathematical expression.

Appellant has not overcome the *prima facie* burden of obviousness as the Appellee has provided sufficient motivation to reject the claim under Giardino et al. The § 103(a) rejection of claims 4-6, 14-16 and 24-26 should be affirmed.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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